

The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte PETER J. WILK

Appeal 2006-1987
Application 09/342,824
Technology Center 3700

Decided: March 16, 2007

Before TERRY J. OWENS, MURRIEL E. CRAWFORD, and STUART S. LEVY, *Administrative Patent Judges*.

OWENS, *Administrative Patent Judge*.

DECISION ON APPEAL

The Appellant appeals from a rejection of claims 1-28, which are all of the pending claims.

THE INVENTION

The Appellant claims medical treatment methods and systems. Claims 1 and 23 are illustrative:

1. A method for treating cancer, comprising:

detecting a tumor in a patient; and

applying mechanical pressure waves to said tumor at a mechanical resonance frequency of the entire tumor as a unitary body, to effectively destroy said tumor.
23. A method for performing a medical operation, comprising:

placing a plurality of electrochemical transducers in pressure-wave-transmitting contact with a patient;

energizing at least some of said transducers with an ultrasonic frequency to produce ultrasonic first pressure waves in the patient;

energizing at least one of said transducers with another frequency in a range below ultrasonic to produce second pressure waves in the patient; and

analyzing ultrasonic third pressure waves produced at internal tissue structures of the patient in response to said first pressure waves to determine three dimensional shapes of said tissue structures and to monitor resonant motion of said tissue structures in response to said second pressure waves.

THE REFERENCES

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| Drewes | US 4,315,514 | Feb. 16, 1982 |
| Granz | US 5,526,815 | Jun. 18, 1996 |
| Wilk | US 5,871,446 | Feb. 16, 1999 |

THE REJECTIONS

The claims stand rejected as follows: claim 1 under 35 U.S.C. § 102(b) as anticipated by Drewes, and claims 1-28 under 35 U.S.C. § 103 as obvious over Wilk in view of Granz and Drewes.

OPINION

The rejection over Drewes is affirmed, and the rejection over Wilk in view of Granz and Drewes is affirmed as to claims 1 and 15 and reversed as to claims 2-14 and 16-28.

Rejection over Drewes

Drewes discloses non-invasive, selective destruction of tumorous tissue cells by ultrasonic transmission (Drewes, col. 1, ll. 7-10). Drewes locates abnormal cells and takes a biopsy of them (Drewes, col. 5, ll. 45-46). The resonant frequency of the biopsy cells is detected by gradually increasing the frequency of a radio frequency generator such that the frequency of an ultrasonic beam generated by a piezoelectric crystal is varied over the expected useful range of resonant frequencies of the biopsy cells (Drewes, col. 6, ll. 16-21). “[C]ells exhibit several resonant frequencies corresponding, for example, to linear motion of the nucleus, distortion of the nucleus, distortion of the cell wall, etc.” (Drewes, col. 6, ll. 23-26). As the ultrasonic beam is varied over the expected resonant frequency range, the resonant frequencies of the cells are indicated by amplified movement of the cell structure as detected by an interferometer (Drewes, col. 6, ll. 43-47). Once the potentially useful resonant frequencies of the biopsy cells are known, the damping coefficients of the cells at those frequencies are determined (Drewes, col. 6, ll. 63-65). Once the damping coefficients corresponding to the resonant frequencies are known, the energy intensity required to destroy the cells at each resonant frequency is determined (Drewes, col. 7, ll. 32-35; col. 9, ll. 3-5, 34-37 and 50-52). The resonant effect that would be imparted to the various intervening body tissues at each potentially destructive resonant frequency is determined, and

then the potentially destructive frequency imparting the least resonant effect to the intervening body tissue is selected (Drewes, col. 10, ll. 3-22). A radio frequency generator is adjusted to drive a crystal at the frequency and intensity of the selected destructive beam until the target cells are destroyed (Drewes, col. 10, ll. 39-50). If the abnormal cells define a growth of some thickness, the intensity of the ultrasonic beam must be increased to compensate for attenuation losses from transmission of the beam through the growth so as to insure destruction of the cells farthest from the beam's source (Drewes, col. 10, ll. 58-63). If the target cells occupy a volume in excess of the focal zone of the lens used to direct the beam, the beam can be scanned to impact the entire abnormal growth without regard to whether neighboring healthy cells are impacted (Drewes, col. 10, l. 66 – col. 11, l. 21).

The Appellant argues that Drewes' method is directed toward small parts of a tumor, and Drewes' resonant frequency is that of individual cells or thinly sliced biopsies of a tumor, not of the tumor as a whole (Br. 5; Reply Br. 1-2). Drewes' beam selected based upon the biopsies has an intensity and resonance frequency that destroys all the target cells in a tumor, even if the tumor is thick or wide, not just the cells in the region in which a biopsy was taken (Drewes, col. 10, l. 49 – col. 11, l. 21). Hence, Drewes' selected beam has "a mechanical resonance frequency of the entire tumor as a unitary body" as required by the appellant's claim 1.

We therefore are not convinced of reversible error in the Examiner's rejection of claim 1 over Drewes.

Rejection over Wilk in view of Granz and Drewes

Because anticipation is the epitome of obviousness, *see In re Skoner*, 517 F.2d 947, 950, 186 USPQ 80, 83 (CCPA 1975); *In re Pearson*, 494 F.2d 1399, 1402, 181 USPQ 641, 644 (CCPA 1974), we affirm the rejection of claim 1 over Drewes in combination with Wilk and Granz.

Claim 15, which depends from claim 1, requires transmitting the mechanical pressure wave through overlying tissues of the patient. Drewes' disclosure that "[a] transmission path through the patient's body to the abnormal cells is then selected" (Drewes, col. 2, ll. 64-65) indicates that the beam is transmitted through tissues overlying the abnormal cells. We therefore affirm the rejection of claim 15 over Drewes in combination with Wilk and Granz.

Wilk discloses "a medical system which determines three-dimensional shapes of internal organs by using ultrasonic pressure waves" (Wilk, col. 1, ll. 14-16). Wilk places adjacent a patient's skin surface a flexible web that is conformable to the patient and has attached thereto at least one electroacoustic transducer and at least one acoustoelectric transducer (Wilk, col. 2, ll. 39-43). The electroacoustic transducer is energized with an electrical signal having an ultrasonic frequency to produce a first pressure wave (Wilk, col. 2, ll. 49-52). In response to the first pressure wave, second pressure waves are produced at internal organs and at the distal end of a medical instrument that has been inserted into the patient (Wilk, col. 2, ll. 46-55). Signals are generated by the acoustoelectric transducer in response to the second pressure waves and are automatically analyzed to determine three-dimensional shapes of the internal organs and a location of the distal end of the medical instrument relative to the internal organs, thereby

enabling real time manipulation of the instrument to conduct a medical operation on a selected one of the internal organs (Wilk, col. 2, ll. 52-61).

Granz discloses “a therapy apparatus for locating and treating a zone in the body of a living subject with acoustic waves” (Granz, col. 1, ll. 10-12). The apparatus includes an electroacoustic transducer that “generates therapeutic acoustic waves focused onto a zone of action in the therapy mode having a first frequency and generates diagnostic acoustic waves in the locating mode having a second frequency, and receives portions of the diagnostic acoustic waves reflected in the body of the subject in the locating mode and converts them into electric signals” (Granz, col. 2, ll. 6-12). The therapeutic and diagnostic waves are ultrasonic, and the frequency of the therapeutic waves is lower than that of the diagnostic waves (Granz, col. 6, ll. 48-53).

The Appellant’s claims 2-14 and 16 require monitoring a tumor’s oscillatory motion resulting from transmission of investigatory pressure waves into a patient. Claims 17-22 require analyzing incoming pressure waves to determine mechanical resonant characteristics of internal tissue structures of a patient, and determining which of a plurality of transducers on a carrier are to be energized to resonantly overload one of the tissue structures and thereby destroy it. Claims 23-28 require monitoring resonant motion of tissue structures in response to below-ultrasonic pressure waves in a patient.

The Examiner argues that “[i]t would have been obvious to one skilled in the art at the time the invention was made to have used the transducers of Wilk’446 in view of Granz et al.’815 to detect resonant frequencies of selected cells and use a destructive frequency for the selected

cells as a way of treatment as taught by Drewes et al.'514 as an alternative way to treat the area of interest" (Answer 4).

For a prima facie case of obviousness to be established, the teachings from the prior art itself must appear to have suggested the claimed subject matter to one of ordinary skill in the art. *See In re Rinehart*, 531 F.2d 1048, 1051, 189 USPQ 143, 147 (CCPA 1976). The mere fact that the prior art could be modified as proposed by the Examiner is not sufficient to establish a prima facie case of obviousness. *See In re Fritch*, 972 F.2d 1260, 1266, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992). The Examiner must explain why the prior art would have suggested to one of ordinary skill in the art the desirability of the modification. *See Fritch*, 972 F.2d at 1266, 23 USPQ2d at 1783-84.

The Examiner's argument that one of ordinary skill in the art would have used the transducers of Wilk and Granz to monitor resonant motion of tissue structures as an alternative way to treat the area of interest does not include the required explanation as to why the references themselves would have fairly suggested doing so to one of ordinary skill in the art. The Examiner, therefore, has not carried the burden of establishing a prima facie case of obviousness of the inventions claimed in the Appellant's claims 2-14 and 16-28.

DECISION

The rejection of claim 1 under 35 U.S.C. § 102(b) over Drewes is affirmed. The rejection of claims 1-28 under 35 U.S.C. § 103 over Wilk in view of Granz and Drewes is affirmed as to claims 1 and 15 and reversed as to claims 2-14 and 16-28.

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No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(2006).

AFFIRMED-IN-PART

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